12-12-2011

Changing Course Requirements for the Chemistry Major and for the ACS Certified Chemistry Major

The College at Brockport, College Senate

The College at BROCKPORT
State University of New York

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Resolution # 02 2011-2012
COLLEGE SENATE

TO: Dr. John R. Halstead, College President

FROM: The College Senate: *December 12, 2011*

RE: ⇨ I. Formal Resolution *(Act of Determination)*
II. Recommendation *(Urging the Fitness of)*
III. Other, For Your Information *(Notice, Request, Report, etc.)*

SUBJ: ***Changing Course Requirements for the Chemistry Major and for the ACS Certified Chemistry Major*** *(#07_11-12UC)*

Signed: _____ Date: 2/13/2012
(John Daly, 2011-12 College Senate President)

Please fill out the bottom portion and follow the distribution instructions at the end of this page.

TO: John Daly, College Senate President

FROM: John R. Halstead, College President

RE: ⇨ I. Decision and Action Taken on Formal Resolution (circle choice)
a. Accepted - Implementation Effective Date: Immediately
b. Deferred for discussion with the Faculty Senate on ____/____/____
c. Unacceptable for the reasons contained in the attached explanation

II, III. Response to Recommendation or Other/FYI
a. Received and acknowledged ____/____/____
Comment:

Signed: _____ Date: 2/20/12
(Dr. John R. Halstead, President, The College at Brockport)

DISTRIBUTION
Upon approval, the College President will forward copies of resolutions to his staff who will, in turn, forward copies to their staff. The College Senate Office will post resolutions to the College Senate Web at http://www.brockport.edu/collegesenate/resolutions.

COLLEGE SENATE OFFICE
RESOLUTION PROPOSAL COVER PAGE
DEADLINE FOR SUBMISSIONS: FEBRUARY 28
Incomplete proposals may be returned and proposals received after the deadline may not be reviewed until next semester.

Routing Number *Routing # assigned by Senate Office*	**#07_11-12UC** *Use routing number and title in all reference to this proposal.*
This Proposal Replaces Resolution	

INSTRUCTIONS – *please, no multiple attachments – submit each proposal electronically as one Word document.*

- Submit only complete proposals with this cover page, attachments and support letters from your department chair and dean merged into one Word document.
- Signed documents may be submitted as hard copies.
- Use committee guidelines available at brockport.edu/collegesenate/proposal.html.
- **Locate the Resolution # and date this proposal will replace at our "Approved Resolutions" page on our Web site.**
- Do not send your proposal as a .pdf file.
- Email your proposal as one attachment to senate@brockport.edu. Signed pages can be sent/faxed as hard copies.
- All revisions must be resubmitted to senate@brockport.edu with the original cover page including routing number.
- Questions? Call the Senate office at 395-2586 or the appropriate committee chairperson.

1. PROPOSAL TITLE: Please be somewhat descriptive, i.e. *Graduate Probation/Dismissal Proposal* rather than *Graduate Proposal.*

Proposal for changing course requirements for the Chemistry Major and for the ACS certified Chemistry Major

2. BRIEF DESCRIPTION OF PROPOSAL:

Requiring a foundation course for inorganic chemistry and removing elective requirement. For the ACS certified BS degree in chemistry also allowing more upper-division electives.

3. WILL ADDITIONAL RESOURCES AFFECTING BUDGET BE NEEDED? _x_ NO ___ YES **EXPLAIN YES**

4. DESCRIBE ANY DATA RELATED TO STUDENT LEARNING OUTCOMES ASSESSMENT USED AS PART OF THE RATIONALE FOR THE REQUESTED SENATE ACTION.

Departmental annual assessment of student learning outcomes.

5. HOW WILL THIS EFFECT TRANSFER STUDENTS: **Same as on non-transfer students**

6. ANTICIPATED EFFECTIVE DATE: **Fall semester of 2013**

7. SUBMISSION & REVISION DATES: PLEASE DATE ALL REVISED DOCUMENTS TO AVOID CONFUSION.

First Submission	*Updated on*	*Updated on*	*Updated on*

8. SUBMITTED BY: (contact person)

Name	*Department*	*Phone*	*Email*
Markus M. Hoffmann	Chemistry	-5587	mhoffman@brockport.edu

9. COMMITTEES TO COPY: (Senate office use only)

Standing Committee	Forwarded To	Dates Forwarded
__ Bylaws Committee	Standing Committee	
__ Enrollment Planning & Policies	Executive Committee	
__ Faculty & Professional Staff Policies	Passed GED's to Vice Provost	
___General Education & Curriculum Policies	Senate	12/12/11 approved
__ Graduate Curriculum & Policies	College President	
__ Student Policies	OTHER	
___Undergraduate Curriculum & Policies	REJECTED -WITHDRAWN	

NOTES: 11/21/11 brought to Ex. Com. 11/28/11 Senate Minutes: first reading

1.) A side-by-side comparison of the old and new program in tabular form

a) Major in Chemistry

Previous Requirements		Proposed Changes	
CHM205 - 206, College Chemistry I and II	8	CHM205 - 206, College Chemistry I and II	8
CHM301, Chemical Safety	1	CHM301, Chemical Safety	1
		CHM302, Inorganic Chemistry I	***4***
CHM303, Analytical Chemistry I	4	CHM303, Analytical Chemistry I	4
CHM305 - 306, Organic Chemistry I and II	8	CHM305 - 306, Organic Chemistry I and II	8
CHM400 - 401, Seminar I and II	2	CHM400 - 401, Seminar I and II	2
CHM405 - 406, Physical Chemistry I and II	6	CHM405 - 406, Physical Chemistry I and II	6
CHM408 - 409, Physical Chemistry Lab I and II	2	CHM408 - 409, Physical Chemistry Lab I and II	2
CHMXXX, Chemistry Elective	3	***no longer required***	
Chemistry Credits	34	Chemistry Credits	35
MTH201 – 202 - 203, Calculus I, II, and III	12	MTH201 – 202 - 203, Calculus I, II, and III	12
Math Credits	12	Math Credits	12
PHS235 - 240, College Physics I and II	8	PHS235 - 240, College Physics I and II	8
Physics Credits	8	Physics Credits	8
General Education	variable	General Education	variable
Electives	variable	Electives	variable
Summary of Credit Hour Changes			
Required Courses (54 credits)		Required Courses (55 credits)	

b) ACS certified Major in Chemistry, additional requirements Major in Chemistry courses listed under a)

Previous Additional Requirements		Proposed Changes	
CHM341, Advanced Organic Chemistry Lab I	1	CHM467, Biochemistry I	3
CHM414, Instrumental Methods II	3		
CHM416, Instrumental Methods lab	1	***Six lecture credits of either***	***6***
CHM431, Inorganic Chemistry*	3	CHM413, Instrumental Meth I, Spectral Interp.	(3)
CHM432, Inorganic Chemistry Lab	1	CHM414, Instrumental Methods II	(3)
CHM467, Biochemistry I	3	CHM417, Computational Chemistry	(3)
		CHM431, Inorganic Chemistry II*	(3)
		CHM468, Biochemistry II	(3)
CHM342, Advanced Organic chemistry Lab II	1		
OR		***Four lab credits of either***	***4***
CHM470, Biochemistry Laboratory	1	CHM341, Advanced Organic Chemistry Lab	(1)
		CHM342, Advanced Organic chemistry Lab II	(1)
		CHM416, Instrumental Methods lab	(1)
		CHM432, Inorganic Chemistry Lab II*	(1)
		CHM470, Biochemistry Laboratory	(1)
		CHM499 Independent Study in Chemistry*	(3-6)
Additional Credits	13	Additional Credits	13

* Course registrations will be submitted to change course names for CHM 431 and 432. Course registrations for Independent Study in Chemistry (CHM399 and CHM499) have already, independently of this proposal, been submitted to introduce more differentiating features between CHM399 and CHM499. Besides supervised laboratory work CHM499 will require a significant writing component and thus meets ACS guideline criteria for "Laboratory Experience" (see section 2).

Suggested Pattern for the Chemistry Major

	Fall Semester	Cr.	Spring Semester	Cr.
Freshman Year	CHM205 College Chemistry I	4	CHM206 College Chemistry II	4
	MTH201 Calculus I	4	MTH202 Calculus II	4
	ENG112 Composition	3	General Education Elective	3
	GEP100 Acad. Plan. Sem.	1	General Education Elective	3
	GEP150 Computer Skills	1	General Education Elective	3
	General Education Elective	3		
		16		17
Sophomore Year	CHM305 Organic Chemistry I	4	CHM306 Organic Chemistry II	4
	CHM302 Inorganic Chemistry I	4	CHM303 Analytical Chemistry I	4
	PHS235 College Physics I	4	PHS240 College Physics II	4
	MTH 203 Calculus III	4	General Education Elective	3
		16		15
Junior Year	CHM301 Chemical Safety	1	CHM406 Physical Chemistry II	3
	CHM405 Physical Chemistry I	3	CHM409 Physical Chemistry Lab II	1
	CHM408 Physical Chemistry Lab I	1	Elective	3
	Elective	3	Elective	3
	Elective	3	Elective	3
	Elective	3	Elective	3
		14		16
Senior Year	CHM400 Seminar I	1	CHM401 Seminar II	1
	Elective	3	Elective	3
	Elective	3	Elective	3
	Elective	3	Elective	3
	Elective	3	Elective	3
		13		13
			Total Credits	120

Suggested Pattern for the ACS certified Chemistry Major

	Fall Semester	Cr.	Spring Semester	Cr.
Freshman	CHM205 College Chemistry I	4	CHM206 College Chemistry II	4
Year	MTH201 Calculus I	4	MTH202 Calculus II	4
	ENG112 Composition	3	General Education Elective	3
	GEP100 Acad. Plan. Sem.	1	General Education Elective	3
	GEP150 Computer Skills	1	General Education Elective	3
	General Education Elective	3		
		16		17
Sophomore	CHM305 Organic Chemistry I	4	CHM306 Organic Chemistry II	4
Year	CHM302 Inorganic Chemistry I	4	CHM303 Analytical Chemistry I	4
	PHS235 College Physics I	4	PHS240 College Physics II	4
	MTH 203 Calculus III	4	General Education Elective	3
		16		15
Junior	CHM301 Chemical Safety	1	CHM406 Physical Chemistry II	3
Year	CHM405 Physical Chemistry I	3	CHM409 Physical Chemistry Lab II	1
	CHM408 Physical Chemistry Lab I	1	ACS Degree Lecture Elective	3
	CHM467 Biochemistry I	3	ACS Degree Lab Elective	1
	ACS Degree Lab Elective	1	Elective	3
	Elective	3	Elective	3
	Elective	3		
		15		14
Senior	CHM400 Seminar I	1	CHM401 Seminar II	1
Year	CHMXXX Chemistry Elective	3	ACS Degree Lab Elective	1
	ACS Degree Lecture Elective	3	Elective	3
	ACS Degree Lab Elective	1	Elective	3
	Elective	3	Elective	3
	Elective	3	Elective	3
		14		14
			Total Credits	121

2.) A brief rationale for changes:

The chemistry degree program has been in its current form since Senate resolution 22 was passed during the 1988-89 academic year. The chemistry department's program is approved by the American Chemical Society (ACS), and we thus offer a basic BS degree in chemistry and an ACS-certified BS degree in chemistry, which requires additional lecture and laboratory courses. Although our two chemistry degree programs have stood the test of time and have prepared our majors well as documented by first job-placement and graduate school acceptance (about half of our majors continue their education at the graduate level), it is time to adjust our curriculum in response to current trends and to strengthen further the preparation of our majors. Specifically, with the proposed changes we address the following issues:

a) The American Chemical Society has recently adopted new guidelines for undergraduate chemistry degree program with ACS certification. As of Sept. 2, 2011, the complete current ACS guidelines can be found on the ACS website at: http://portal.acs.org/portal/PublicWebSite/about/governance/committees/training/acsapproved/degreeprogram/WPCP_008491

   One major change made is that besides two semesters of introductory chemistry all other courses are categorized into foundation courses followed by advanced courses that build on the foundation courses, and we cite here the portions of the guidelines that pertain to this major change:

*"**Foundation Course Work.** Foundation course work provides breadth and lays the groundwork for the in-depth course work. Certified majors must have instruction equivalent to a one-semester course of at least three semester credit hours in each of the five major areas of chemistry: analytical chemistry, biochemistry, inorganic chemistry, organic chemistry, and physical chemistry. Programs operating on the quarter system can achieve this breadth with at least eight three-credit one-quarter courses that include the equivalent of at least one quarter of coverage of each of the five areas. Foundation course work typically builds on the introductory chemistry experience… Some areas, particularly organic and physical chemistry, have traditionally been taught as year-long courses. This practice may continue, using the first semester course in the sequence as a foundation course and the second-semester course as an in-depth course..."*

*" **In-Depth Course Work.** The curriculum for the certified major must also include at a minimum the equivalent of four one-semester courses or six one-quarter courses (corresponding to at least 12 semester or 18 quarter credit hours) of in-depth course work. An in-depth course builds on prerequisite foundation course work..."*

*" **Laboratory Experience.** The certified major must have 400 hours of laboratory experience beyond the introductory chemistry laboratory. Laboratory course work must cover at least 4 of the 5 foundation areas of chemistry and may be distributed between the foundation and in-depth levels...Undergraduate research can serve as part of the laboratory hours and the in-depth course work if accompanied by a comprehensive written report."*

   While our current program still fulfills the minimum number of required foundation and advanced courses, we recognize that our ACS degree chemistry program currently lacks a true foundation course for Inorganic Chemistry. As is, the current Inorganic Chemistry course CHM 431 with lab CHM 432, would have to be counted as a foundation course in terms of the ACS requirements but is really meant to be taught as an in-depth course.

b) Student performance in Analytical Chemistry has clearly demonstrated that Chemistry majors are not sufficiently prepared from taking the pre-requisite courses College Chemistry I and II. The new Inorganic Chemistry I course CHM 302 will be offered the fall semester prior to taking Analytical Chemistry, and will alleviate this deficiency. Moreover, we recognize that our chemistry program as a whole lacks descriptive chemistry, which will be a major component of this new foundation course in Inorganic Chemistry.

c) Now that the new ACS guidelines allow for more flexibility for the in-depth courses, many more of our upper-division elective courses qualify as in-depth courses, and our changes to the ACS certified chemistry degree reflect that new flexibility. Moreover, offering the new inorganic foundation course will create even more flexibility for students because students will no longer be forced to take CHM 431 (currently offered only in alternate years), which currently counts as the required foundation course in inorganic chemistry. In turn, the overall increased flexibility allows us to offer some of our low-enrolment upper-level courses every other year without jeopardizing the opportunity of a particular chemistry major to graduate with the ACS certified degree. We have already found ourselves forced to offer CHM 431 only every other year over the past four years. We have done our best through advisement to ensure that every major considering the ACS certified degree takes that course when we offer it. With the increased flexibility this will not be a problem anymore, and in fact, we are hopeful that a higher fraction of our majors will be able to graduate with the ACS-certified chemistry degree.

d) The new Inorganic Chemistry I course CHM 302 will particularly help our transfer students, because it will ensure that they are on an equal footing with Brockport native chemistry majors before taking Analytical Chemistry CHM 303. The increase of credits by one will not jeopardize their ability to complete a major in chemistry with or without ACS accreditation within two years. Provided that they have indeed completed College Chemistry and Organic Chemistry as well as Physics and Math co-requisites (for Math to at least Calculus II) before entering The College, their junior and senior years' schedule would be as follows:

Transfer students completing the Chemistry Major.

Junior	CHM301 Chemical Safety	1	CHM303 Analytical Chemistry I	4
Year	CHM302 Inorganic Chemistry I	4	Elective	3
	MTH303 Calculus III	4	Elective	3
	Elective	3	Elective	3
	Elective	3	Elective	3
		15		16
Senior	CHM400 Seminar I	1	CHM401 Seminar II	1
Year	CHM405 Physical Chemistry I	3	CHM406 Physical Chemistry II	3
	CHM408 Physical Chemistry Lab I	1	CHM409 Physical Chemistry Lab II	1
	Elective	3	Elective	3
	Elective	3	Elective	3
	Elective	3	Elective	3
	Elective (variable)	1		
		15		14

Transfer students completing the ACS certified Chemistry Major.

Junior	CHM301 Chemical Safety	1	CHM303 Analytical Chemistry I	4
Year	CHM302 Inorganic Chemistry I	4	ACS Degree Lecture Elective	3
	MTH303 Calculus III	4	ACS Degree Lab Elective	1
	Biochemistry I	3	Elective	3
	ACS Degree Lab Elective	1	Elective	3
	Elective	3		
		16		14
Senior	CHM400 Seminar I	1	CHM401 Seminar II	1
Year	CHM405 Physical Chemistry I	3	CHM406 Physical Chemistry II	3
	CHM408 Physical Chemistry Lab I	1	CHM409 Physical Chemistry Lab II	1
	ACS Degree Lecture Elective	3	ACS Degree Lab Elective	1
	ACS Degree Lab Elective	1	Elective	3
	Elective	3	Elective	3
	Elective	3	Elective	3
		15		15

3.) Description of any new courses

CHM 302: Inorganic Chemistry 1
Prerequisite: CHM 206. Studies of atomic structure, trends in properties within the periodic table, covalent bonding models, structures of simple solids, acid-base chemistry, oxidation-reduction chemistry, physical techniques in inorganic chemistry, chemical equilibrium, inorganic qualitative analysis, and the descriptive chemistry of the elements. Three hours lecture and 3.5 hours laboratory per week. 4 Cr. Fall

4.) Staffing issues

The new course CHM 302 Inorganic Chemistry I will require staffing the lecture (3 contact hours) and the lab (3.5 contact hours). However, because of the increased flexibility of upper-division course choices to complete the ACS certified chemistry major, we will be able to offer some of our low enrollment upper level courses such as for example Instrumental Methods II CHM 414 and its lab CHM 416 every other year, without jeopardizing that our majors can complete the ACS certified major within four years. This will free up staff to teach the new course.
Furthermore, the changes are planned to become effective for the fall 2013 semester, when we can safely assume that the chemistry department will have moved back to Smith Hall (currently planned to be reopened for fall 2012) and will have recovered from the disruptions associated with the move. Once back in Smith Hall, we will be able again to accommodate a larger number of students per lab section in the laboratory for General Chemistry I than we can right now in the temporary spaces. This will reduce staffing needs as we can accommodate the same number of students in fewer lab sections. Therefore, at this point we do not anticipate the necessity of hiring new faculty to accommodate the proposed changes in the chemistry and ACS certified chemistry majors.

5.) Academic administration commentary

6.) Resources, facilities that may be needed to implement the program

The changes are planned to commence once Smith Hall renovation is completed and necessary laboratory facilities will be available. Initial resources for chemicals and glass ware will not exceed the scope of the departmental budget. As the course evolves in time and more sophisticated instrumentation may be sought by the course instructor, requests will be considered as part of the regular equipment replacement requests within the School of Science and Mathematics.

7.) Letters of support:

Letter of recommendation from chair

Letter of recommendation from Interim Dean of School

RE: Chem proposals

Maliekal, Jose

Sent: Wednesday, October 19, 2011 4:02 PM

To: Godleski, Stephen

Steve,

I endorse the two proposals that the Chemistry Department has submitted to the College for its consideration and action. One of these proposals calls for changing the requirements for the 'regular' Chemistry Major and ACS certified Chemistry Major, whereas the other proposal is to modify the requirements of the Biochemistry Major by adding a foundation course in Inorganic Chemistry, adding a lab course in Physical Chemistry for Life Sciences, and removing the Analytical Chemistry course from the list of required courses.

Sincerely,

Jose Maliekal

Interim Dean
School of Science and Mathematics
The College at Brockport

-----Original Message-----
From: Godleski, Stephen

Sent: Thursday, October 06, 2011 3:50 PM
To: Maliekal, Jose
Subject: Chem proposals

Jose

The Department would appreciate a letter of support from you endorsing the attached proposals. Happy to discuss. Thanks.

Stephen Godleski
Professor and Chair
The College at Brockport, SUNY
Department of Chemistry
585-395-5595

The College at
BROCKPORT
STATE UNIVERSITY OF NEW YORK

Department of Chemistry

I support the proposed changes to the major in Chemistry as recommended by the Curriculum Committee of the Department, endorsed by the faculty of the Department and described in the Senate proposal. The addition of a foundation course in Inorganic Chemistry (CHM 302) will better prepare our majors for their future careers in chemistry as well as allow us to meet the new guidelines issued by the American Chemical Society for ACS certified majors.

Stephen Godleski
Professor and Chair
Department of Chemistry

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